

outer surface of the tooth (fig. 2, Pl. IV.) is slightly concave in the transverse direction, but undulating, from the presence of two slight convex risings which traverse the tooth lengthwise. The inner surface presents at its anterior part a slightly concave surface, and posteriorly two prominent longitudinal convex ridges, separated by a groove which is flat at the bottom, and from the anterior angle of which the reflected fold of enamel penetrates the substance of the tooth, advancing obliquely forwards, rather more than half way across the body of the tooth. A longitudinal ridge of bone projects from the internal side of the socket, and fits into the groove above mentioned, and as a corresponding ridge exists in all the sockets of the grinders, save the two anterior small ones, we may infer that the five posterior grinders on each side, had a similar structure to the tooth above described. The external layer of enamel is uniformly about half a line in thickness; it is interrupted for the extent of nearly three lines at the anterior angle, and for more than double that extent at the posterior part of the tooth, which is consequently worn down much below the level of the rest of the grinding surface. Where the ivory is thus unprotected by the enamel, it has a coat of cæmentum, which also fills up the small interval at the origin of the reflected fold of enamel. On the grinding surface of the entire tooth, and on the fractured ends of the mutilated molars, the component fibres, or tubules, of the ivory, are readily perceptible by the naked eye, diverging from the line which indicates the last remains of the cavity of the pulp of the tooth, as it was progressively obliterated during growth.

Although the complication of the grinding surface by the inflection of simple or straight folds of enamel is peculiarly characteristic of the Rodent type, we must regard the number of molar teeth, and their diminution of size as they advance towards the anterior part of the jaw, in the *Toxodon*, as indicative of a deviation from that order, and an approach to the *Pachyderms*. The common number of grinders in the upper jaw of Rodent animals is eight, four on each side. In some genera, as *Lemmus*, *Mus*, *Cricetus*, there are only three on each side, and in *Hydromys* and *Aulacodus*, only two on each side. In *Lepus*, however, we find six on each side of the upper, and five on each side of the lower jaw. The *Toxodon*, like the *Tapir* and *Hippopotamus*, has seven on each side of the upper jaw: the first in each of these species being the smallest. It is worthy of notice, however, that the *Capybara* which adheres to the Rodent type in the number of its molars, presents in the vastly increased size, and additional number of component laminae of the posterior grinders, an approximation to the pachydermatous character just aduced, and the bony palate at the same time presents an expansion between these molars, offering a resemblance to the *Toxodon* which I have not found in any other Rodent besides the *Capybara*.

The most important deviation from the Rodent structure presented by the teeth, occurs in the direction of the reflected fold of enamel, and such a deviation

might have been inferred, even in the absence of the teeth, from the structure of the articular surface, or glenoid cavity for the reception of the condyle of the lower jaw. As the ridge of enamel runs, as above described, in a direction approaching that of the longitudinal axis of the skull, it is obvious that the grinding motions of the lower jaw should be in a proportionate degree in the transverse direction. The glenoid cavity, therefore, instead of being a longitudinal groove, and open behind, as in the true Rodents, is extended transversely, and is defended behind by a broad descending bony process preventing the retraction of the jaw, and showing marks of the forcible pressure to which it was subject.

It is worthy of observation that, in the *Wombat*,—which exhibits the Rodent type of dentition, and, like the *Toxodon*, has remarkably curved molars, but in an opposite direction,—the condyle of the lower jaw is also extended transversely, and adapted to an articular surface, which admits of lateral motion in the trituration of the food. In the outward span of the zygomatic arches, in which *Toxodon* deviates from the Rodentia, we may trace a relation of subordination to the above structure of the grinding teeth and joint of the lower jaw: the widening of the arches giving to the masseter muscles greater power of drawing the jaw from side to side. The depth of the zygoma bespeaks the magnitude of these masticatory muscles, and the included space shews that the temporal muscles were also developed to a degree, which indicates the force with which the great incisors at the extremity of the jaws, were used; probably, like the canines of the *Hippopotamus*, to divide or tear up by the roots the aquatic plants, growing on the banks of the streams, which the *Toxodon* may have frequented.

In the Rodentia, the zygoma, though sometimes as deep as in the *Toxodon*, is generally almost straight, and the space included between it and the cranium is consequently narrow. The zygoma also is placed more forwards in all true Rodents, than in the *Toxodon*; and, instead of abutting against the posterior alveoli, it terminates opposite the anterior ones. It thus affords such an attachment to the masseter, that this muscle extends obliquely backwards to its insertion in the lower jaw, at an angle which enables it to act with more advantage in drawing forwards the lower jaw,—a motion for which the joint is expressly adapted. In many Rodents, also, there is a distinct muscle, or portion of the masseter, which passes through the ant-orbital foramen, which is on that account of large size. In examining the cranium of *Toxodon*, with reference to this structure, it was found that the ant-orbital foramen was not larger than might have been expected to give transmission to nerves requisite for supplying with sensibility the large lips, and whiskers with which the expanded muzzle of this remarkable quadruped was probably furnished.

Having thus examined the cranium of the *Toxodon* in its relation, as a